

# CHAPTER 4

## ACCIDENT INVESTIGATION AND ANALYSIS

### HOW TO INVESTIGATE, ANALYZE, AND DOCUMENT ACCIDENTS

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# CHAPTER 4

## ACCIDENT INVESTIGATION AND ANALYSIS

### HOW TO INVESTIGATE, ANALYZE, AND DOCUMENT ACCIDENTS

#### 4.00 INTRODUCTION

This chapter provides an understanding of investigative techniques that can be used to investigate accidents associated with any work activity.

Investigating and documenting occupational injuries and illnesses is a mandatory requirement of the Department's Injury and Illness Prevention Program and the California Occupational Safety and Health Administration (Cal/OSHA) regulations.

#### 4.01 PURPOSE

The purpose of Chapter 4 is to provide information regarding accident investigation techniques and procedures. An accident is broadly defined as an undesired event that results in physical harm to a person or damage to property and/or the interruption of a process. It also includes events that result in a non-injury, a near miss, an occupational illness, or exposure to hazardous substances.

These guidelines do not provide a ready answer to accident prevention, but rather a guide to aid in accident investigations, analysis, and corrective action. Corrective action must focus on such things as eliminating unsafe conditions and correcting unsafe acts.

#### 4.02 POLICY STATEMENT

Supervisors shall investigate, analyze, and document every vehicle accident, occupational injury and/or illness, and all near miss occurrences. The investigation should be conducted in a timely manner to identify contributing factors that will prevent further incidents. When possible, the investigation should be initiated within 24 hours and completed within 72 hours of the accident. of the accident.

#### 4.03 WHO CONDUCTS ACCIDENT INVESTIGATIONS

Investigating and documenting occupational injuries and illnesses is a mandatory requirement of the Department's safety program and Cal/OSHA regulations.

- **FIRST-LINE SUPERVISOR**

The first-line supervisor investigates all accidents in accordance with departmental policy. The first-line supervisor is typically on the scene and thus would have more knowledge regarding the accident and accident scene.

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- **SECOND-LINE SUPERVISOR**

The second-line supervisor ensures that the first-line supervisor conducts the accident investigation and reviews the first-line supervisor's findings. The reviewing supervisor shall follow-up with the first-line supervisor to ensure that all corrective measures have been taken to avoid further accidents.

- **SAFETY SPECIALIST**

The Safety Specialist advises and/or assists in the investigative effort. Safety Specialist representatives from district or Headquarters Offices of Safety and Health have specialized training and experience that enables them to determine the facts, apparent and hidden. Safety Specialists are impartial and their primary interest is to gather information that can be used to prevent future similar accidents as well as identify policy and regulation violations and suggest corrective measures.

#### **4.04 ACCIDENT SCENE INVESTIGATION**

Investigation of accidents should be conducted as soon as possible. Any delay may result in evidence being altered, destroyed or removed.

The purpose of a documented review of the accident scene is to:

- Identify and locate the physical evidence (materials/machines/tools) involved in the accident;
- Reveal deficiencies in operating policies, processes and procedures; and
- Discover unsafe work practices caused by a lack of training.

The purpose of an accident investigation is to find facts not assign fault. The facts will then serve as a guide to the conditions that caused the accident. The facts should identify the "why" or root cause of the accident as well as the "who, what, when, where, and how."

Fact-finding assists the investigators to expand their thinking and not focus solely on the type of accident or the injury. A broader view of the facts surrounding the accident will help point to contributing factors that lead to the root cause. This expanded view also assists investigators to identify a variety of preventive measures that may be used to correct future similar situations or conditions.

The following information lists a variety of areas that should be included in an accident investigation:

- **WORK CHARACTERISTICS**

What are the type of work activities and the size of the operation?

How many employees are involved? Too many? Too few?

- **ENVIRONMENT**

Was the weather a contributing factor: clear/rain/snow?

Were the conditions of the workplace a factor: in disarray/hazards uncorrected?

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- TIME FACTORS

The accident investigation report should describe the time of day, and how it relates to the shift, whether first hour or last: swing shift/straight eight/rotating; also the phase of the employees work: performing work/rest period/lunch period/overtime/entering or leaving the work site/building/office.

- EMPLOYEE CHARACTERISTICS

What is the victim's work experience?  
How often is the work activity repeated?  
How often has the employee engaged in such work?  
How much training was provided and when was the last training?

- A NARRATIVE DESCRIPTION

Explain what the person was doing.  
What objects were involved?  
Which actions and movements led to the accident?

- EQUIPMENT CHARACTERISTICS

Describe the type, brand/model/size and any distinguishing features/condition/specific part of the equipment involved (include the identification number, and any known modifications that may have been made to the equipment).  
Was the safety equipment or guard removed or properly utilized?

- CHARACTERISTICS OF THE TASK

What was the general task being performed (e.g., repairing a wing plow) and the specific activity (e.g., using a power impact wrench)?  
The posture and location of employee?  
Working alone or with others?  
Was this the correct tool for the task?

- PREVENTIVE MEASURES

What personal protective equipment was being worn?  
What kind of training did the employee have for the task he/she was performing?  
Did standards for the procedure exist?  
Were they written?  
Were they followed?  
Where was the supervisor at the time of the accident?

- ACCIDENT SEVERITY

Describe the nature of the injury or injuries and parts of the body affected.  
Was more than one employee injured?

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## INVESTIGATIVE FACTORS

The countless number of situations and contributing factors precludes listing all the questions that may apply to a specific accident or event. The following list is generally applicable and should be considered in addition to the statements shown on the accident investigation form.

- What were others doing at the time of the accident?
- Was the person following clearly defined procedures?
- Was the process or task new to the group?
- Did the person/crew receive hazard recognition training?
- Was the person doing authorized work?
- Was the person qualified to do the work?
- Was the correct equipment being used?
- Where was the supervisor?
- Was some type of corrective action previously suggested but not taken?

After reviewing these statements, the final analysis should suggest specific corrective action(s) that will prevent recurrences of events that led to the accident.

### 4.05 CORRECTIVE ACTION

For corrective action to take place, the investigator must present facts that show the incident would not have happened if an event had not taken place. To do this, the investigator must first reach a basic understanding of events and the sequence in which they occurred. The following factors should be analyzed:

- **MACHINES**
  - Hazardous conditions/construction/design; and
  - Equipment, tools, and objects.
- **PHYSICAL WORK ENVIRONMENT**
  - Location of equipment, tools, and objects in the workplace
  - Location of employees in the work space
- **EMPLOYEES**
  - Action/task/activity
  - Work procedures
  - Personal protective equipment
- **MANAGEMENT**
  - Supervision
  - Program evaluation
  - Training

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When the event requiring corrective action is isolated, the corrective action must be evaluated on the basis of practicality, cost, feasibility, reliability, and acceptance.

The investigator then must determine if an unsafe condition or act caused the event. An unsafe condition is a mechanical and/or physical hazard that is recognized but not corrected and/or ignored, or an unrecognized mechanical and/or physical hazard. An unsafe act is an employee deviation from a written and/or verbal instruction, policy, procedure or work practice.

The following causes of unsafe acts are considered the most frequent cause of accidents:

- |                           |                              |                    |
|---------------------------|------------------------------|--------------------|
| • Physical inability      | • Overconfidence             | • Absentmindedness |
| • Boredom                 | • Disregard of danger        | • Undue haste      |
| • Distraction             | • Anger                      | • Indifference     |
| • Impatience              | • Horseplay                  | • Fatigue          |
| • Resentment of authority | • Inattention to instruction | • Stress           |
| • Anxiety                 |                              |                    |

When other questions come to mind, they should be recorded and answered. Summarize the information and record all the facts on the accident report.

The following illustrates some of the contributing human factors listed above:

A worker who lacks skill at a job of loading heavy parts may become fatigued from his/her efforts to do what a more skilled worker would do easily. This same unskilled worker may fall behind and then try to hurry to catch up. Encountering a minor difficulty, he/she may lose patience and throw his/her weight needlessly into the task resulting in a fall or other injury. It is easy to recognize that contributing factors to the unsafe act may have been anxiety or impatience. Other factors were undue haste, fatigue, and a lack of skill. However, the *root cause* was a lack of proper training.

#### **4.06 PREPARING THE INVESTIGATIVE REPORT**

Accurate records of accidents or near-misses are essential to a successful accident investigation and analysis program. Well-documented accident investigations will contain information that can be used to avoid future accidents.

The investigation should be handled by the supervisor and reviewed by others as may be deemed appropriate. The investigator should know the nature of the work, how it should be performed, and under what conditions it was performed. The investigator's questions and attitude should demonstrate that the purpose is to gather the facts, not find fault or fix blame.

The investigation should point to the cause of the accident and answer the following questions:

- At what point did the system break down?
- Were rules and regulations violated?
- Did poor layout of the job, process, or operation contribute to the accident?
- What human or environmental factors contributed to the accident?

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The investigator should start with reviewing and assessing the accident scene. The events that led up to the accident should be reconstructed. A walk-through and talk through re-enactment may help explain relationships between the work crew or person, the machine, and the environment.

**NEVER ASK AN EMPLOYEE(S) TO REPEAT A JOB WHERE AN OBVIOUS VIOLATION OF DIRECTIVES OR AN UNSAFE WORK PRACTICE IS EVIDENT.**

To document the accident scene, take pictures, measure, and draw a diagram. List all the machines, equipment, and materials that were being used. Obtain a list of witnesses. If an injury is minor, proceed with the investigation; however, if there are seriously injuries, the investigation should be postponed until medical needs have received attention.

#### **4.07 COMPLETING THE ACCIDENT INVESTIGATION FORM**

This chapter provides two (2) accident investigation forms. The first is a short-version, two-page document that should be used when injuries require first aide only. The second form is six (6) pages and provides for a more in-depth analysis.

#### **REVIEWS AND APPROVALS:**

The following is a list of individuals who shall review the Accident Investigation Form:

1. Supervisor
2. Branch Chief, Region Manager, Area Superintendent
3. Safety Coordinator (functional area)
4. District Safety and Health Officer (district employee)
5. Headquarters Safety and Health Officer (Headquarters employee)

**ACCIDENT INVESTIGATION REPORT #1-**  
**Minor Personal Injury Accident Investigation Report**

Date of Accident or Event: \_\_\_\_\_ Time of Day: \_\_\_\_\_ am \_\_\_\_\_ pm

Name of Injured Employee:

\_\_\_\_\_

Name of Supervisor/Investigator:

\_\_\_\_\_

What was the apparent nature of the employee's injuries?

\_\_\_\_\_  
\_\_\_\_\_

DESCRIPTION OF ACCIDENT: What was the employee doing?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

LOCATION: Where did the accident happen?

\_\_\_\_\_  
\_\_\_\_\_

WITNESSES: List the names of other employees who may be witnesses:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

UNSAFE CONDITIONS: What was unsafe about the operation, equipment/tools, or the location?  
Why did the unsafe condition exist?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



UNSAFE ACTS: What was done/not done, or what did anyone do/fail to do that led to the accident?

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RECOMMENDATIONS: What action has been/should be taken to prevent a similar accident?

1. 

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  2. 

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  3. 

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REMARKS OR COMMENTS:

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PREPARED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

COPY SENT TO:

District/Headquarters Safety Office DATE: \_\_\_\_\_

\_\_\_\_\_ DATE: \_\_\_\_\_

ACCIDENT INVESTIGATION REPORT #2

Date of Accident or Event: \_\_\_\_\_ Time of Day: \_\_\_\_\_ am \_\_\_\_\_ pm

Date of Investigation: \_\_\_\_\_

Identification Number: \_\_\_\_\_

Location: \_\_\_\_\_

Type of Work Activity: \_\_\_\_\_

Name of Supervisor: \_\_\_\_\_

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ACCIDENT CATEGORY: ☐ INJURY ☐ NON-INJURY ☐ NEAR-MISS ☐ ILLNESS  
☐ EXPOSURE TO HAZARDOUS SUBSTANCE ☐ PROPERTY DAMAGE ☐ OTHER

Name of employee injured, ill or exposed:

\_\_\_\_\_

Classification:

\_\_\_\_\_

EMPLOYEE WORK STATUS:

☐ Full-Time ☐ Part-Time ☐ Seasonal ☐ Other: \_\_\_\_\_

How long in current assignment? \_\_\_\_\_ How long with Department? \_\_\_\_\_

WHAT IS THE APPARENT NATURE OF THE EMPLOYEE'S INJURY/ILLNESS?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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THE ACCIDENT SCENE: Describe the accident scene. Where did the accident happen? (e.g., in Room 222/Highway 20/PM 7:35/the #2 toll booth at the Bay Bridge.)

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THE ACCIDENT OR EVENT: Describe what happened. (e.g., the Maintenance worker removed the cap from the gasoline tank. The gas spilled onto the ground causing the worker to slip and fall. The worker twisted his ankle and broke his arm when he fell.)

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IDENTIFY WHAT WAS BEING USED: What objects/tools/substances were involved? (e.g., The ladder was not supported/The table saw was in the "on" position/Possible lack of oxygen in the confined space/Soap and water/Cleaning solvent not ventilated.)

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DESCRIBE THE WORK ENVIRONMENT?

(Weather/temperature/light/noise/machinery/aisles/features existing at the time of the accident.)

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WHAT VEHICLE/EQUIPMENT WAS BEING USED?

(Type/brand name/size/features/model number/condition/how old/parts involved.)

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WHAT WAS THE SPECIFIC TASK/WORK ACTIVITY?

(Repairing computer/repairing a wing plow/walking up the stairs/flagging traffic/sitting at drafting table/walking on airport runway.)

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OTHER SPECIFIC ACTIVITY: (Posture, movement/shoveling snow/using power impact wrench/squatting under conveyor belt/pushing mail cart/lifting copy machine cover)

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THE WORK CREW: (How many in work crew? Working alone or with others?)

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TIME FACTORS AND THE TIME OF DAY: HOW IT RELATES TO THE SHIFT: (First half of shift/overtime/rotating/straight eight/rest period/lunch break/entering the work area/leaving the work area.)

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PROTECTIVE EQUIPMENT/PREVENTIVE MEASURES: (Personal protective equipment being used -- hard hat/glasses/gloves/clothing. Did apparel affect the accident? Were all safety guards in place?)

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WORK/SAFETY STANDARDS: (Did standards exists for the job? Were they written/verbal/ followed/understood? Was a Code of Safe Operating Procedures discussed?)

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SCHEDULING OF WORK: (Did the work/task have to be scheduled at the time of the accident? Could the work/task have been scheduled at a different time or date?)

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SUPERVISION: (What was the nature of supervision? Supervisor present/not present: leadworker present/not present)

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TRAINING/INSTRUCTION: (Had employee been specifically trained in the activity?)

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SAFETY MEETING: Tailgate Meeting Held For This Activity: \_\_\_\_\_  
and/or Pre-Job Meeting Conducted: \_\_\_\_\_ date

OTHER COMMENTS: (Summary) continued on next page.

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OTHER COMMENTS: (continued)

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INVESTIGATED BY:

\_\_\_\_\_ Date: \_\_\_\_\_

REVIEWED BY:

\_\_\_\_\_ Date: \_\_\_\_\_

RECOMMENDATIONS:

The following corrective actions are recommended:

1. \_\_\_\_\_

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2. \_\_\_\_\_

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3. \_\_\_\_\_

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RECOMMENDATIONS APPROVED:

By: \_\_\_\_\_ Date: \_\_\_\_\_

Comments: \_\_\_\_\_

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COPY SENT TO: \_\_\_\_\_ Date: \_\_\_\_\_

**ACCIDENT INVESTIGATION REPORT:**

**USE THIS SPACE FOR NOTES, SKETCHES, OR DRAWINGS.**

ADDITIONAL SHEETS ATTACHED: YES \_\_\_\_ NO \_\_\_\_